Prairie Carnation®: a new crop for western Canada

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Abstract

Prairie Carnation (*Saponaria vaccaria* L.) is a member of the family Caryophyllaceae. The crop is intended for large-scale contract production on the prairies. Several members of this plant family are grown as ornamentals. No members of the Caryopyhllaceae are used as food or feed products in Canada. Prairie Carnation® will be used as a renewable bio-product crop to produce fine starches for cosmetics and other industries. Saponins extracted from the seed will be used for veterinary and medical applications and are being tested as a vaccine adjuvant and also as an active compound for some clinical treatments. Peptides from Saponaria seeds show antibiotic effects and are tested as cosmetic active compounds. Research has been conducted to advance crop development in 2005 and 2006 at the Alberta Research Council (ARC) in Vegreville, Alberta. Trials included seeding date, seeding rate x spatial arrangement, fertility, timing of fungicide application and crop tolerance to herbicides. Preliminary results indicate that Prairie Carnation® has considerable potential to be a commercially and agronomically successful crop.

Introduction

Before starting new crop development several issues must be addressed. A suitable crop needs to be identified. Such as crop must be easy to grow in the desired region, have potential uses better filled by the new crop, and have a relatively short development time, generally within 5-10 years. Investors need to be found, then significant agronomic and market development can begin. Prairie Carnation® (*Saponaria vaccaria* L.) meets these criteria.

Prairie Carnation® is a member of the family Caryophyllaceae. Members of this plant family and genus are grown as ornamentals. No members of the Caryopyhllaceae are used as food or feed products in Canada.

Prairie Carnation® is intended for large-scale contract production on the prairies. It is a new value-added crop that has been under development for SAPONIN Inc. for the past 5 years. Investors have been engaged and potential markets defined. It will be used as a renewable bio-industrial crop to produce fine starches for cosmetics and other industries. Saponins, extracted from the seed, will be

used for veterinary and medical applications and are being tested as a vaccine adjuvant and as active compounds for some clinical treatments. Peptides from Saponaria seeds show antibiotic effects and are tested as active compounds in cosmetics. Alberta Research Council in Vegreville and National Research Council in Saskatoon are the partners of SAPONIN Inc. in this research project.

The objective of this paper is to outline principles of agronomic development of the new crop, Prairie Carnation®.

Methods and Results

Saponaria vaccaria is often considered a fallow weed in the Dark Brown and Brown soil zones. It is largely not found in the Thin Black and Black soil zones. To develop *Saponaria vaccaria* into the crop, Prairie Carnation®, weeds were identified as a major priority and a large-scale field trial was undertaken in 2005 to reflect this. This trial simultaneously considered the effects of fertility, the requirement for a weed-free period and target plant density. Since Prairie Carnation® has similarities to canola, such as similar seed size, we added nutrients based on 0, 50, and 100% of the recommended rate for canola. The weed-free period varied by 2-leaf pair intervals from the 0-6 leaf pair stage. Target plant densities were 50, 100, and 200 plants per meter squared. Additionally, a herbicide crop tolerance trials were undertaken at several locations.

The crop emerged prior to the weeds, but weeds were able to catch up to the crop and surpass it (Figure 1). This preliminary trial had two important outcomes. Firstly, we recognized that herbicides would play an important role in the development and production of Prairie Carnation®. Secondly, we found that the ARC Vegreville site had considerable disease pressure. Consequently considerable priority was given to weed and disease control in 2006.


Figure 1. Weedy and weed-free plots of Prairie Carnation® from the 2006 field trial.

In 2006, a greenhouse herbicide screen was undertaken and potential candidates for field use were assayed. The fertility and critical period of weed control were performed as separate trials and crop tolerance trials continued. Several new field trials were undertaken. These included development of a disease and insect nursery, a fungicide application timing trial, a seeding date trial, a seeding rate *x* spatial arrangement trial, and a seed increase were undertaken. Data from these trials are currently being analyzed. Preliminary results indicate:

- The disease problem is easily soluble with fungicides.
- Herbicide candidates include soil-applied herbicides as well as some in-crop herbicides.
- Higher seeding densities, in conjunction with crop seeding effectively suppresses weeds.
- Prairie Carnation® is less nutrient-demanding than other crops.
- Trials are planned for 2007 to solidify results from 2006 and to consider herbicide interactions in crop tolerance.

Conclusions

- Agronomic development of a new crop has to examine "first principles", such as 1) herbicide options and optimal herbicide timing, 2) crop growth and development as related to fertility, disease, and time of seeding.
- Prairie Carnation® is proving to be a viable crop, easily adapted for growth under a wider range of conditions and soil types than might be expected from its natural distribution
- Collaboration between Saponin Inc. and the Alberta Research Council has led to rapid and effective crop development.